

# SOLAR ELECTRIC GENERATORS



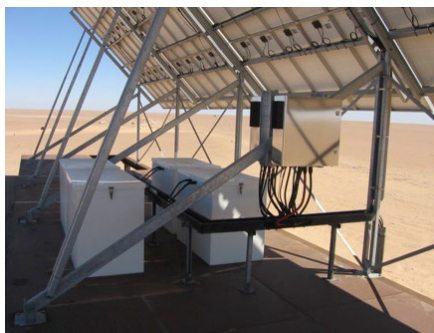
DATASHEET  
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Solar Energy Generators for Cathodic protection applications are designed and built according to the required DC Output, battery bank autonomy and location parameters

Each system will comprise of the following elements :

- PV Modules Crystalline PV modules with aluminium frame and IP54 integrated junction box.
- Array Structure Galvanised steel frame structure complete with all fasteners for PV modules, mounting of control enclosure and for the electrical system.
- Ground Fixings Anchor bolts are supplied with dimensioned foundation drawings.
- Battery Bank Three--day autonomy ,Sealed Lead Acid batteries with all interconnects are supplied as standard. Other battery technologies are available for challenging locations.
- Battery Enclosures Stainless Steel or GRP enclosure are IP54 minimum and acid resistant.
- Control System State--of--the--art, fully automatic battery management and protection. Controllers include comprehensive monitoring, communications and data recording capabilities. Stainless Steel enclosure included as standard.
- Cable System All interconnect cables and glands included. All system cables are long life and highly resilient to environmental factors. Armoured cables are available if required.
- Documentation Installation, operation and maintenance manual.



**BAC**<sup>®</sup>

CORROSION CONTROL

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# CHARGE CONTROLLERS

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The SSL series of Charge Controllers is one of the most flexible solar regulator ranges available, giving the end-user the ability to meet even the most demanding of specifications. The microprocessor-based control allows both pre-set and custom settings for all regulation values and alarm voltages, which can be readily modified using the alphanumeric LCD screen and keypad. A wide range of options are available, including additional alarm contacts, 4-20mA transducers, RS232/RS485 ports with data-logging and analogue and digital inputs – all of which can be programmed to suit.

Standard features include:

- Three-stage series regulation
- High Volts, Low Volts, Load Cut 1, Load Cut 2 Alarms with LED indication and relay contacts
- Battery Protection: Load Disconnect / Reconnect
- Remote Battery Voltage Sense and Battery Temperature Compensation (External temperature sensor included)
- Regulation, Array Switch and Alarm Status LED's
- Induced Lightning Protection
- Two Load Outputs, configurable with separate Low Voltage Disconnect values
- MCBs fitted on Array Inputs and Load Outputs
- Expansion port for optional modules
- Temperature range: -10°C to +55°C

Enclosures:

The SSL controllers can be supplied in a variety of enclosures: Painted Steel IP66, Stainless Steel (304 and 316L) IP66, GRP IP66 and 19" Rack units. For users who wish to install into their own enclosure, we can supply a kit of parts including all mountings and fixings.

Array and Load Switches:

The standard Array Switch is a solid-state module, rated at 30A per array and includes blocking diodes. Alternatively, we can fit higher-rated 40A solid-state modules, or Mercury Displacement Relays (MDRs) and contactors rated up to 80A per array.

The standard controller is supplied with two solid-state Load Switches, each rated at 25A. These can be readily re-configured to act as a single 50A switch - either in the factory or by the end user - or for greater load demands, we can replace these with MDRs or contactors rated up to 200A.

Battery Connection:

High-current stud terminals suitable for cables up to 120mm<sup>2</sup> are provided. Although we recommend the battery is protected at the battery location, we can also fit MCBs or MCCBs for additional safety.



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# CHARGE CONTROLLERS

## Alarms:

The standard 4 volt-free programmable relays can be increased with 4-relay modules connected to the expansion port. The 'Common Alarm' will trigger on any other alarm being active, with 'System Normal' having a normally-energised 'Common Alarm' function. Variable delays before operation can also be set.

## Configurable alarms include:

- Battery Sense Fail
- Temperature Sense Fail
- Array Fail
- High Battery Volts
- Low Battery Volts
- Low Charge Alarm
- Load Disconnect 1
- Load Disconnect 2
- Common Alarm/System Normal
- High Temperature Alarm
- Low Temperature Alarm
- Generator Start

## Control and Display:

The heart of the regulator is a Microchip PIC© micro-controller, which continuously monitors the Battery Voltage Sense input, Temperature Sensor input, Array inputs, Load Current and Array Current. Based on the regulation set-points, a three-stage charging scheme (Boost, Equalisation and Float Modes) is used to control the charging of the battery. The battery is protected from over-voltage and undervoltage conditions by High Volts, Low Volts and Load Disconnect Alarms (there are two Load Disconnects, one of which can be used for non-essential load shedding). All set-points can be adjusted on site and in addition, functional tests of array and load switches and alarm relays can be undertaken. The two-line alphanumeric display is the interface between the user and the controller. Using push-button switches, an operator can readily monitor and, where appropriate, vary the controller parameters.

## Voltage and Polarity:

The SSL controller has a separate plug-in PSU module suitable for 12V, 24V and 48V battery systems. This allows the controller voltage to be readily re-configured if necessary, and regulation and alarm settings are automatically adjusted to take into account any change in both voltage and polarity. The modules also contain circuitry to isolate the controller in the event of the battery being disconnected. Changing system polarity simply involves reconnecting four cables.

## Custom Versions:

The SSL controller can be supplied to meet customer requirements that exceed the standard specifications below. Recent projects include dual-redundant controllers with array currents of 480A and peak Load currents in excess of 180A, regulators combined with an isolated and regulated DC distribution panel, and combined Charge Regulator and Cathodic Protection Controller in a single enclosure. Enclosures can be supplied with viewing windows, padlock hasps, and pre-drilled or with removable gland-plates. As an OEM, we are also happy to brand our controllers with customers' names and logos, and provide custom software for specific functions.

## Communications, Data-Logging and Options:

The addition of an RS232 or RS485 port allows remote monitoring, uploading of settings and the Downloading of up to 250 days of historical data. PSTN and quad-band GSM modems can also be supplied. Users can select between our own ASCII-based protocol or MODBUS, and we can provide software to run on Microsoft© Windows-based PCs or laptops. Other add-on modules include:

- 4-20mA Transducers
- 4-channel Signal Relays
- 8-channel Digital Input
- Reference Cell input
- Aux. Temperature Sensor
- Fault Current Detectors

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# SOLAR PANELS

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A high quality crystalline silicon cell module designed specifically for off-grid applications and manufactured in Western Europe.

- 36 series connected 156mm x 156mm high efficiency silicon cells
- Anodised aluminium frame (standard silver or polyester-coated)
- Robust construction: tempered 3.2mm-thick glass with a high level of transmissivity.
- Tyco IP65 connection box including bypass diodes.
- Excellent response in low light conditions.
- Resistant to wind loads of 2400 Pa and
- Surface loads up to 5400 Pa.

## Quality

- ISO 9001-2015 & 14001
- MSC, CE Class II.
- Complies with IEC 61215 (Ed.2) and IEC 61730 (Ed.1)

## Performance Warranties

- Output power guarantee: 25 years.
- 10 years, free from manufacturing faults

## Performance Specifications

### Standard Test Conditions (STC)

STC = 1000W/m<sup>2</sup> irradiance, 25°C module temperature, AM 1.5 spectrum

Rated Power ( Pmax)	165	W
Voltage at Max Power (Vmp)	19.22	V
Current at Max Power (Imp)	8.59	A
Voltage at open circuit (Voc)	23.50	V
Current at short circuit (Isc)	9.04	A
Power data (Ptolerance)	±5	%
Cell Efficiency	>18	
Module Efficiency	17	%
Bypass Diodes	2	%
Temperature coefficients		
Power	-0.43	%/°C
Voltage	-0.32	%/°C
Current	0.04	%/°C
Operating Temp	-40 to +85°C	Mechanical
Dimensions (±2mm)		
1476 x 659 x 35 mm (L x W x D)		
Weight	11.9	kg
Ingress Protection	IP65	



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# CP CONTROLLERS

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The CPC25A and CPC50A are part of the new generation of Cathodic Protection Controllers, which feature microprocessor control, three programmable alarm/function relays, built-in interrupt timer, and an RS232 Port with Data Logging as standard. The two-line alphanumeric LCD displays by default the operating parameters of the unit: the output voltage set-point and actual, output current set-point and actual and half-cell (reference electrode) voltage set-point and actual.

Active alarms are indicated and, using the keypad and digital potentiometer, it is also used to set up other parameters, such as low current and high current alarms, auxiliary input mode and the interrupt timer. The CPC controllers are available housed in painted steel, stainless steel or GRP enclosures, or can be supplied as PCB or mounting plate assemblies for customer final assembly. The controllers include GDT, MOV and Zener diode protection against lightning and other induced surges.

## Operation:

High speed pulse-width-modulated (PWM) switching technology is used to obtain high conversion efficiency. The controllers can operate in one of three modes: constant voltage, constant current and half-cell voltage control with automatic changeover of control mode. The half-cell input can be sampled every 60 seconds (adjustable) with the input reverting to high impedance between sampling to prevent loading of the half-cell. Note the CPC range must operate from a battery.

## Communications and Data Logging:

The CPC25A and CPC50A are supplied with an RS232 port which includes data logging. When connected to a PC or laptop, all main parameters and the present status can be viewed. The main set points and relay settings can be uploaded, and over 10,000 timed log events downloaded. The logging period can be set to 15, 30 or 60 minute intervals and the addition of a GSM or PSTN modem allows full remote access and control

## Main Specifications:

Input Voltage Range: 12V System: 10V to 16V : 24/48V Systems: 20V to 64V Positive Common Only

Max. Output Current: 25A or 50A (Adjustable in 0.1A steps)

Max Output Voltage: 12/24/48V or Input Voltage (Adjustable in 0.1V steps)

Data Log Capacity: Timed events: 10,208 max. Alarm events: 2,048 max.

Programmable Relay Functions: Low Input Volts

Low Output Current

High Output Current

System Normal/Common Alarm

System (Output) Disabled

Auxiliary Input Active

Interrupt Timer settings: On: 1 to 9,999 seconds Off: 1 to 9,999 seconds

Operating Temperature range: -10°C to +58°C

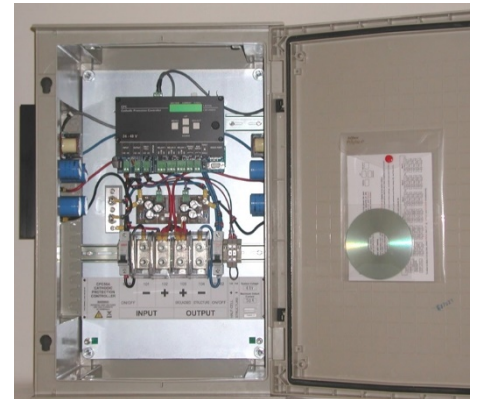
Enclosure rating: Painted Steel and Stainless Steel: IP66 : GRP : IP65

Enclosure dimensions: Steel (25A): 610 x 406 x 205mm

Steel (50A): 610 x 610 x 205mm

GRP (25A and 50A):

645 x 435 x 250mm (H x W x D)



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# CP CONTROLLERS

## DATASHEET 1.25 SEG



The CPC10A is part of the new generation of Cathodic Protection Controllers, featuring microprocessor control, three programmable alarm/function relays, built-in interrupt timer, and optional RS232 Port with Data Logging.

The two-line alphanumeric LCD displays by default the operating parameters of the unit: the output voltage setpoint and actual, output current setpoint and actual and half-cell (reference electrode) voltage set-point and actual. Active alarms are indicated and, using the keypad and digital potentiometer, it is also used to set up other parameters, such as low current and high current alarms, auxiliary input mode and the interrupt timer.

The CPC10A controller is available housed in painted steel, stainless steel or GRP enclosures, or can be supplied as a PCB or mounting plate assembly. The controller includes GDT and MOV protection against lightning and other induced surges.

### Operation:

High speed pulse-width-modulated (PWM) switching technology is used to obtain high conversion efficiency. The CPC10A can operate in one of three modes: constant voltage, constant current and half-cell voltage control with automatic changeover of control mode. The half-cell input can be sampled every 60 seconds (adjustable) with the input reverting to high impedance between sampling to prevent loading of the half-cell. Note the CPC10A must operate from a battery.

### Communications and Data Logging:

The CPC10A can be supplied with the RS232 port option which includes data logging. When connected to a PC or laptop, all main parameters and the present status can be viewed. The main set points and relay settings can be uploaded, and over 10,000 timed log events downloaded. The logging period can be set to 15, 30 or 60 minute intervals and the addition of a GSM or PSTN modem allows full remote access and control.

### Main Specifications:

Input Voltage Range: 12V System: 10V to 16V : 24/48V Systems: 20V to 64V Positive common Only

Max. Output Current: 10A (Adjustable in 0.1A steps)

Max Output Voltage: 12/24/48V or Input Voltage (Adjustable in 0.1V steps)

Data Log Capacity: Timed events: 10,208 max. Alarm events: 2,048 max.

Programmable Relay Functions: Low Input Volts

Low Output Current

High Output Current

Common Alarm

System Normal

System (Output) Disabled

Auxiliary Input Active

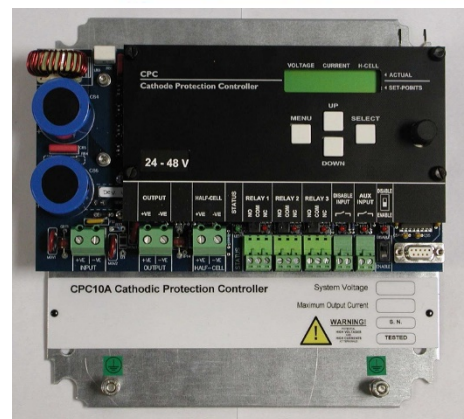
Interrupt Timer settings: On: 1 to 9,999 seconds Off: 1 to 9,999 seconds

Operating Temperature range: -10°C to +58°C

Enclosure rating: Painted Steel and Stainless Steel: IP66 : GRP : IP65

Enclosure dimensions: Steel: 300 x 300 x 150mm G

GRP: 430 x 330 x 200mm (H x W x D)



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# BATTERIES

# DATASHEET

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Sonnenschein A600 SOLAR is a premium range, developed specifically for applications where cycling is required. It has extraordinary energy-saving features in addition to robust reliability, proven for decades in many installations world wide.



- Exceptional cycling performance – 3000+ cycles\* at 60 % Depth of Discharge C10
- > dryfit Gel – VRLA technology
- > Lowest energy consumption – saving costs
- > Strong tubular plate technology – for longer life in the toughest conditions
- > Proof against deep discharge – greater long-term energy delivery
- > Horizontal mounting possible – easy installation and maintenance
- > Completely recyclable – low CO2 footprint Your

- > Nominal capacity 294 – 3919 Ah C120 (20°C)
- > Cycling performance at 20 °C (with IU charging): 2400 cycles at 60 % Depth of Discharge (C10) at 20 °C For enhanced performance and for systems  $\geq 48$  V we recommend IU charging, to reach 3000+ cycles at 20 °C
- > Designed in accordance with IEC 61427 and IEC 60896-21/22
- > Long shelf life up to 2 years at 20 °C without recharge due to the very low self discharge rate
- > Also available as flame-retardant version on request (V0)
- > Manufactured in Europe in our ISO 9001 certified production plants
- > Trouble-free transport of operational cells, no restrictions for rail, road, sea and air transportation (IATA, DGR, clause A67)
- > Approval: UL (Underwriter Laboratories)



Nominal capacity 294 – 3919 Ah C<sub>100</sub>



Single cell



Tubular plate



Recyclable



Valve regulated lead-acid batteries



Proof against deep discharge



Maintenance-free (no topping up)



3000+ cycles\* at 60 % DoD C<sub>100</sub>

\*With IU charging, at 20 °C



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